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10/015,500	12/11/2001	Amit Datta	7129.045	6537

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LAW OFFICES OF LEO ZUCKER
SUITE 480
50 MAIN STREET
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EXAMINER

WONG, EDNA

ART UNIT	PAPER NUMBER
1753	

DATE MAILED: 10/27/2003

11

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)
	10/015,500	DATTA, AMIT
	Examiner	Art Unit
	Edna Wong	1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 09 October 2003 (Amendment).

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-7 and 21-35 is/are pending in the application.

4a) Of the above claim(s) 1-7 and 21 is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 22-35 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 11 December 2001 is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

- Certified copies of the priority documents have been received.
- Certified copies of the priority documents have been received in Application No. _____.
- Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5

4) Interview Summary (PTO-413) Paper No(s). _____

5) Notice of Informal Patent Application (PTO-152)

6) Other: _____

Election/Restrictions

Applicant's election without traverse of Group II, claims **22-35**, in Paper No. 10 is acknowledged.

The requirement is deemed proper and is therefore made FINAL.

Accordingly, claims **1-7 and 21** are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Oath/Declaration

The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

It is noted that this application appears to claim subject matter disclosed in prior Application No. 60/254,751, filed December 11, 2000. A reference to the prior application must be inserted into the Declaration under 35 USC 119(e).

Drawings

I. The drawings are objected to because the "Sin ~ (Ag) strike ?" in Fig. 2 is indefinite. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

II. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Applicants' specification discloses that "FIG. 1 is a schematic illustration of a prior art metallization scheme" (page 2, line 23).

Specification

The disclosure is objected to because of the following informalities:

page 3, line 22, the words -- (not shown) -- should be inserted after the number "10".

page 3, line 23, the words -- (not shown) -- should be inserted after the number "12".

page 3, line 24, the words -- (not shown) -- should be inserted after the numbers "14" and "16".

page 3, line 15, the words -- (not shown) -- should be inserted after the number "18".

page 10, line 10, "150F and 250F" should be amended to -- 150°F and 250°F --.

Appropriate correction is required.

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

Claims 22, 33 and 35 are objected to because of the following informalities:

Claim 22

line 4, it is suggested that the words "selecting the barrier layer from the group including" be amended to the words – wherein the barrier layer is selected from the group consisting of --.

Claim 33

lines 1-2, it is suggested that the words "selecting the outer layer from the group including" be amended to the words – wherein the outer layer is selected from the group consisting of --.

Claim 35

lines 1-2, it is suggested that the words "including selecting the strike layer from the group comprising" be amended to the words – wherein the strike layer is selected from the group consisting of --.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

Claims **26-29** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 26

line 3, the alternative expression of the Markush group is improper. MPEP-2173.05(h). The word "and" should amended to the word -- or --.

Claim 27

line 2, the alternative expression of the Markush group is improper. MPEP-2173.05(h). The word "and" should amended to the word -- or --.

Claim 30

line 1, "the plating bath solution" lacks antecedent basis.

line 2, the alternative expression of the Markush group is improper. MPEP 2173.05(h). The word "and" should be amended to the word -- or --.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 22-24, 26, 31 and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by **Chow et al.** ("*Interdiffusion of Cu Substrate/ Electrodeposits for Cu/Co, Cu/Co-W, Cu/Co/Ni and Cu/Co-W/Ni Systems*", Surface and Coatings Technology, Vol. 99, Issues 1-2, 5 February 1998, pp. 161-170).

Chow teaches a method for treating a contact surface of a metal electrical contact, comprising the steps of:

(a) electroplating a barrier layer (= a cobalt layer or a cobalt-tungsten layer) over the contact surface (= copper substrates);

(b) selecting the barrier layer from the group including cobalt, cobalt-nickel alloys, cobalt-tungsten alloys, cobalt-nickel-tungsten alloys and rhodium (= cobalt and cobalt-tungsten); and

(c) forming the thickness of the barrier layer in the range of from about 0.00001 inch to about 0.0001 inch (= 0.5 and 1.5 μm = 0.00002 and 0.000006 inch) [page 162,

"2. Experimental details"].

The contact surface is etched with a light acid (= lightly etched in a mixture of 45% sulfuric acid, 22% nitric acid, 0.1% hydrochloric acid and 32.9% distilled water) [page 162, "2. Experimental details"] before the electroplating step.

The contact surface is activated (= 10% aqueous solution of hydrochloric acid) before electroplating (page 162, "2. Experimental details").

The electroplating step includes preparing a plating bath solution having at least one of cobalt sulphamate, cobalt sulfate and cobalt chloride (= for Cu/Co system, cobalt chloride and for Cu/Co-W system, $\text{CoSO}_4 \cdot 7\text{H}_2\text{O}$) [page 162, "2. Experimental details"].

The plating bath solution is prepared with a tungsten salt (= $\text{Na}_2\text{WO}_4 \cdot 2\text{H}_2\text{O}$) and an organic acid (= citric acid) [page 162, "2. Experimental details"].

The tungsten salt is sodium tungstate (= $\text{Na}_2\text{WO}_4 \cdot 2\text{H}_2\text{O}$) [page 162, "2. Experimental details"].

The organic acid is citric acid [page 162, "2. Experimental details"].

The metal electrical contact is provided in the form of a copper contact member (= copper substrates) [page 162, "2. Experimental details"].

An outer layer is applied over and in contact with the barrier layer (= nickel) [page 162, "2. Experimental details"].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

I. **Claims 25, 27-29 and 33-35** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Chow et al.** ("*Interdiffusion of Cu Substrate/ Electrodeposits for Cu/Co, Cu/Co-W, Cu/Co/Ni and Cu/Co-W/Ni Systems*", Surface and Coatings Technology, Vol. 99, Issues 1-2, 5 February 1998, pp. 161-170) as applied to claims **22-24, 26, 31 and 32** above.

Chow is as applied above and incorporated herein.

Chow does not teach wherein the barrier layer is electroplated by adjusting a plating current density in the range of from about 10 to about 150 amperes per square foot; wherein the outer layer is selected from the group including tin, gold, palladium, platinum, silver and combinations thereof; and wherein the plating bath solution is prepared with ammonium oxide.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one skilled in the art would have been motivated to have modified the method of Chow with wherein the barrier layer is electroplated by adjusting a plating current density in the range of from about 10 to about 150 amperes per square foot because the current density is a result-

effective variable and one skilled in the art has the skill to calculate the current density range that would determine the success of the desired reaction to occur, absent evidence to the contrary. MPEP § 2141.03 and § 2144.05(b).

Furthermore, Chow teaches that the current density for the Cu/Co system is from 3.2 to 3.8 A/dm² and for the Cu/Co-W system is 1.2 A/dm² (page 162, "2. Experimental details").

As to wherein the outer layer is selected from the group including tin, gold, palladium, platinum, silver and combinations thereof, this is well within the skill of the artisan dependent upon the intended use of the electrical contact, particularly to the environment to which the electrical contact will encounter, which would be most suited for the application of the electrical contact, absent evidence to the contrary.

As to wherein the plating bath solution is prepared with ammonium oxide, a wide variety of plating additives are known in the art to improve or optimize the plating bath. It is well within the skill of the artisan to add ammonium oxide to the plating bath solution because this would have improved its conductivity, adjust its pH, form complexes with tungsten, or etc. It appears that ammonium oxide is not a significant additive in the art to impart the properties desired, unless proven otherwise.

II. Claims 22-26 and 30-35 are rejected under 35 U.S.C. 103(a) as being

unpatentable over **JP 56-154261**.

The JP reference teaches a method for treating a contact surface of a metal electrical contact, comprising the steps of:

- (a) electroplating a barrier layer (= a Ni-W-Co-P alloy coating) over the contact surface (= copper casting mould);
- (b) selecting the barrier layer from the group including cobalt, cobalt-nickel alloys, cobalt-tungsten alloys, cobalt-nickel-tungsten alloys and rhodium (= a Ni-W-Co-P alloy coating); and
- (c) forming the thickness of the barrier layer in the range of from 10 to a few hundred microns (= 0.0004 inches to thousandths of an inch) [abstract].

The electroplating step includes preparing a plating bath solution having at least one of cobalt sulphamate, cobalt sulfate and cobalt chloride (= cobalt sulfate) [page 4, col. 11].

The plating bath solution is prepared with a tungsten salt (= sodium tungstate) [page 3, col. 10].

The tungsten salt is sodium tungstate (page 3, col. 10).

The plating bath solution is prepared with at least one of nickel sulfamate, nickel sulfate, nickel chloride and organic additives (= nickel sulfate) [page 11, col. 11].

The metal electrical contact is provided in the form of a copper contact member (= copper casting mould) [abstract].

An outer layer (= a Cr coating) is applied over and in contact with the barrier layer

(abstract).

A strike layer (= a Ni coating layer) is applied on said contact surface before electroplating the barrier layer (abstract).

The strike layer is selected from the group comprising of nickel and silver (= nickel) [abstract].

The JP reference does not teach wherein the thickness of the barrier layer is in the range of from about 0.00001 inch to about 0.0001 inch; wherein the contact surface is etched with a light acid before the electroplating step; and wherein the contact surface is activated.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one skilled in the art would have been motivated to have modified the method of the JP reference with wherein the thickness of the barrier layer is in the range of from about 0.00001 inch to about 0.0001 inch because the JP reference teaches a barrier layer having a thickness of 10 microns (0.0004 inch). No difference is seen between a 0.0004 inch layer and a 0.0001 inch layer.

Furthermore, the thickness is a result-effective variable and one skilled in the art has the skill to calculate the thickness that would determine the success of the desired reaction to occur, e.g., copper diffusion, absent evidence to the contrary. MPEP §

2141.03 and § 2144.05(b).

As to wherein the contact surface is etched with a light acid before the electroplating step, this is well within the skill of the artisan for removing copper oxides on the surface of the copper casting mould which would have decrease the adherence of the electroplated barrier layer.

As to wherein the contact surface is activated, this is well within the skill of the artisan for increasing the adherence of the electroplated barrier layer.

III. Claims 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over **JP 56-154261** as applied to claims 22-26 and 30-35 above, and further in view of **Chow et al.** ("*Interdiffusion of Cu Substrate/ Electrodeposits for Cu/Co, Cu/Co-W, Cu/Co/Ni and Cu/Co-W/Ni Systems*", Surface and Coatings Technology, Vol. 99, Issues 1-2, 5 February 1998, pp. 161-170).

The JP reference is as applied above and incorporated herein.

The JP reference does not teach wherein the plating bath solution is prepared with an organic acid and ammonium oxide; and wherein the organic acid is citric acid.

However, Chow teaches a Co-W plating bath solution comprising $\text{Na}_2\text{WO}_4 \cdot 2\text{H}_2\text{O}$

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and citric acid (page 162, "2. Experimental details).

Thus, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one skilled in the art would have been motivated to have modified the method of the JP reference wherein the plating bath solution is prepared with an organic acid and ammonium oxide; and wherein the organic acid is citric acid because a wide variety of plating additives are known in the art to improve or optimize the plating bath. It is well within the skill of the artisan to add ammonium oxide to the plating bath solution because this would have improved its conductivity, adjust its pH, form complexes with tungsten, or etc.

$\text{Na}_2\text{WO}_4 \cdot 2\text{H}_2\text{O}$ and citric acid are known additives in a Co-W plating bath as taught by Chow (page 162, "2. Experimental details).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (703) 308-3818. The examiner can normally be reached on Mon-Fri 7:30 am to 5:00 pm, alt. Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (703) 308-3322. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or

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proceeding should be directed to the receptionist whose telephone number is (703) 308-1495.



Edna Wong
Primary Examiner
Art Unit 1753

EW
October 24, 2003